

MULTICOLOR PHOTODIODE ARRAY AND METHOD OF MANUFACTURING THEREOF

Abstract

Novel structures of the photodetector having broad spectral ranges detection capability (from UV to 1700 nm (and also 2500 nm)) are provided. The photodetector can offer high quantum efficiency $> 95\%$ over wide spectral ranges, high frequency response > 8.5 GHz. The photodiode array of $N \times N$ elements is also provided. The array can also offer wide spectral detection ranges (UV to 1700 nm/2500 nm) with high quantum efficiency $> 85\%$ and high quantum efficiency of > 8.5 GHz, cross-talk of $< 1\%$. In the array, each photodiode can be independently addressable. The photodetector element consists of the substrate, buffer layer, absorption layer, contact layer, and the illumination surface with thin contact layer. The illumination surface can be circular, square, rectangular or ellipsometrical in shape. The photodiode array consists of the photodiode elements of $N \times N$, where each element can be independently addressable. The sensor can be fabricated as top-illuminated type or bottom-illuminated type. The photodi-

ode and its array provided in this invention, could be used in multiple purpose applications such as telecommunication, imaging (where CCD and CMOS sensor cannot be used), and also many sensing applications including surveillance, satellite tracking, advanced lidar systems, etc. The most important advantage of this photodiode is that the performance will not be degraded under wide range of temperature variation, which eliminates the use of the temperature controller. Other advantage of this invention is that conventional fabrication technology can be used to fabricate the single photodiode or its array herein described.